

## GEOGRAPHICAL DISTRIBUTION AND VARIATION OF THE GENUS ARGYNNIS

### I. INTRODUCTION

### II. ARGYNNIS IDALIA

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### I. INTRODUCTION

THE GENUS ARGYNNIS in the comprehensive sense covers a wide variety of form and size in Nymphalid butterflies. The geographical distribution of the genus as a whole is somewhat comparable to that of *Colias* but is actually wider in some areas due to a tropical group in the eastern hemisphere. A natural desire to have a greater similarity of type within a "genus" and a desire of some workers to "split" to the ultimate has left the genus in a diverse state of fragmentation. This has been aided by regional preferences and the difficulty for most Lepidopterists to observe and study members of the group from continents other than their own. The members of the genus from the smaller isolated continents such as North America and South America have apparently either diverged slightly from the type on the largest land mass (Eurasia) or they have retained more primitive features. In North America only two of the several subdivisions of type within the *Argynnis* appear ever to have arrived for colonization. These two have diverged to such an extent on that continent that residents of that continent of natural inclination should consider them as of different genera (*Boloria* and *Speyeria*). One of these (*Speyeria*) is only slightly different from one of the species groups of Eurasian *Argynnis*, namely, *aglaja*, *adippe*, *niobe*, etc. and placed by some in a genus *Brenthis* which is not the usage of *Brenthis* used in North America by others.

The variety of the genus in Eurasia is much greater than in North America. It is natural to expect that the types present in Eurasia which would be most like those now present in North America would be those whose climatic adaptations would be the most similar to the conditions present in the area where a land bridge exists now or did exist in the immediate past. This is the area of Alaska and adjacent Siberia. The *Boloria* group is the best adapted to the climates of this area and may even now be considered for all practical purposes to have "continuity" across the barrier at the Bering straits. With the possibility of gene flow not very remote, it is not difficult to see why *Boloria*

of North America and Asia (Europe) should be much alike. In fact, several species of *Boloria* can and do go under the same species name on both continents, just as do three species of *Colias* which have the same geographical relationships to the land bridge.

The species which are the most remote in their climatic preferences from the climates of the Bering area are those species which are the most divergent on the two continental areas; these are the most southern types. *Argynnis paphia* is the member of a southern subgenus of *Argynnis* in Eurasia and this subgenus apparently never colonized America. Instead, a type similar to *aglaja* apparently did colonize America and from this presumably all the American *Argynnids* of the larger (*Speyeria*) type subsequently were derived. It is an hypothesis that the most extreme types in North America, such as *idalia*, *diana* and *nokomis*, which bear considerable pattern and color relationship to Eurasian species such as *paphia*, *sagana*, *childreni*, etc. were derived independently from them from *aglaja* — like ancestors under the selective influence of the comparable conditions of climate to which they were subjected (hot-humid summers). Comparative correlations of the *facies* of the butterflies with climates at different parts of the world will be made later in this series.

The *Argynnis* of South America bear no close relationship apparently to the *Argynnis* of any other part of the world. There is no easy way at the present time for them to have arrived there by migration from other continents. Only two alternate proposals seem possible. The first of these is that these *Argynnis* were isolated many years ago (the early Tertiary) from the other *Argynnis* of the world and that they arrived there by migration from North America at a time when North America was inhabited by a more primitive type. They might also have arrived from Africa early in the evolution of the genus should there be reason to believe seriously in the past movement of South America away from a more close proximity to Africa. The second proposal on the origin of the South American *Argynnis* is one of independent origin in South America from some tropical or subtropical relative of the North American *Argynnis*. This proposal seems very weak in view of the lack of any close relative that would seem to be a likely ancestor. *Dryas* (*Colaenis*), *Dione* and *Euptoieta* seem to be out of the question, though this may be only based upon superficial appearances. They feed upon similar plants, a factor greatly favoring the argument, especially with regard to *Euptoieta* which inhabits cold country in the Andes, feeds on violets and has much the same habits as *Argynnis* itself.

The question comes up as to what is a genus. Should the entire group which has been pictured here be considered one genus, or should it be raised up to a sub-family or even a family. If the latter, then should the major groups be raised from subgeneric level to the generic? If so, then how many groups at this level should be recognized? The question is then condensed to one problem. There really is no biological entity which can be known as a genus. All hopes to the contrary,

the genus is solely a matter of convenience in nomenclature, which should show as much as possible, phylogenetic relationships. The system should start at the bottom of the classification hierarchy. If it is known what should be considered species, sufficient related species ought to be put into a genus to make a reasonable group on the basis of numbers and morphological (genetical) similarity. Should too few species be put into a genus the advantages of the binomial nomenclature are destroyed, in much the same way as would occur if every person had the family name *Smith*. A further criterion, in addition to size and uniformity, is geographical coverage. It is a natural phenomenon that isolation leads to differentiation. Related members of a species group may diverge slightly due to continental isolation and yet in all other ways be closely knit as a single group. The decision here must rest on the needs of the taxonomist in showing relationships and the usefulness to biologists. Nomenclature bears one major value: that of usefulness. If different generic names were to be used on each continent, a degree of provincialism would develop which would be hard to penetrate; local butterfly books in North America and in Europe have now diverged to such an extent in terminology that the only way a novice can determine relationships between the butterflies of Europe and North America is to look at the specimens—an ironic turn of events since that should be the purpose of nomenclature. As a result therefore, it is the hope that there may be a return to the larger genera of the past; this is the thesis upon which the use of *Argynnis* here is based, without necessarily accepting the assumption that the generic limits and the characters used for their delimitation should remain as in the past if more specific future work should show the need for change.

## II. ARGYNNIS (SPEYERIA) IDALIA

This representative of the North American *Argynnis* differs in appearance from the usual *Speyeria* probably more than any other except possibly for *A. diana*. The details of its pattern which are distinctive and different from the standard *Argynnis* pattern are the greatly increased black pigment around the borders of the wings, even extending to the basal section and nearly covering the hind wings, but at the same time leaving free of black pigmentation, the marginal and submarginal rows of spots (fig. 1 and 2). The general *facies* therefore is distinctive and different from any other *Argynnis*. At the same time, the black pattern elements of the center of the fore wing are reduced rather than expanded as in all other related *Argynnis*. It therefore shows a development of a pattern not only unlike that of the *Argynnis*, including the subgenus *Speyeria* as indicated by Dos Passos and Grey, but a trend in a diametrically opposed direction. The distinctiveness of this species is such as to need no real description or detailed analysis. Likewise, from the study of specimens throughout the geographic range of the species, there are no geographical variations apparent, though there are in-





Fig. 1. *Argynnis idalia*, upper side; top: male; bottom: female. from Oak Park, Illinois. July 8, 1906. F. S. Daggett.



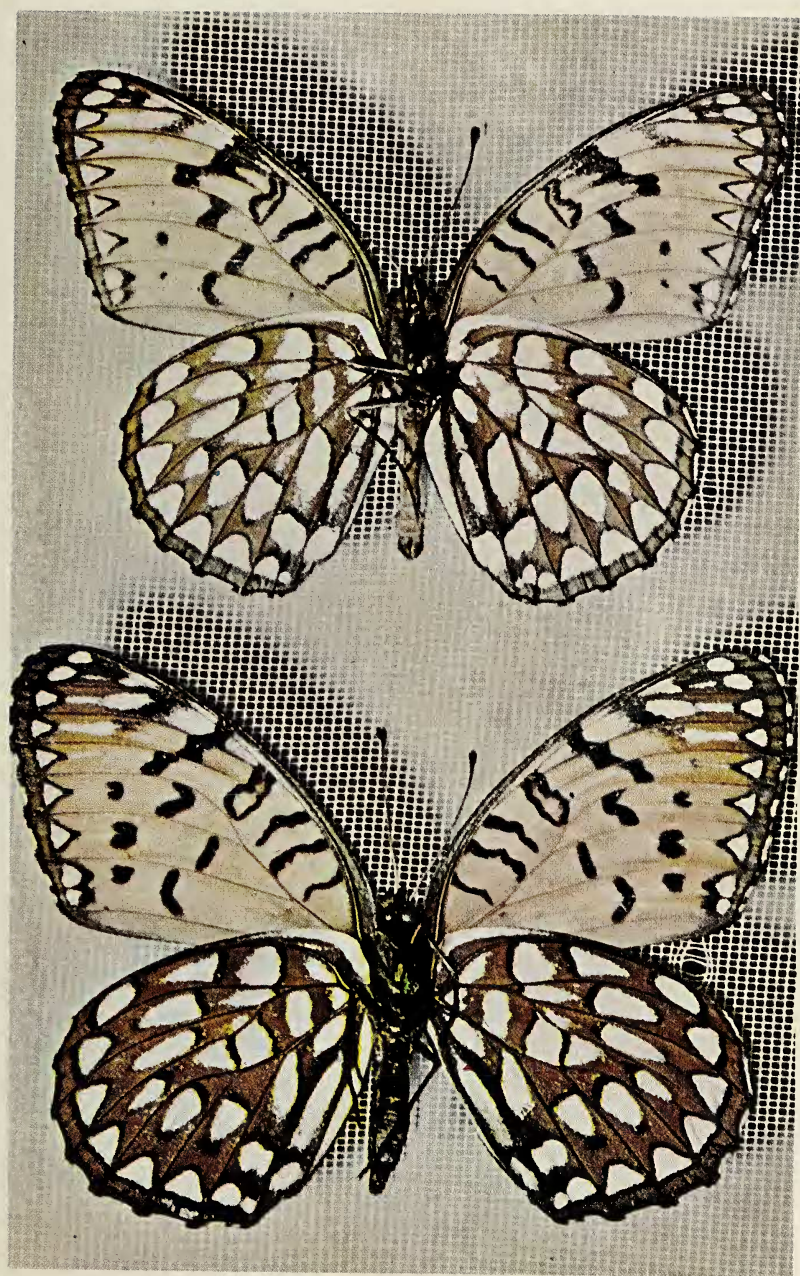


Fig. 2. *Argynnis idalia*, same as fig. 1 only lower side.

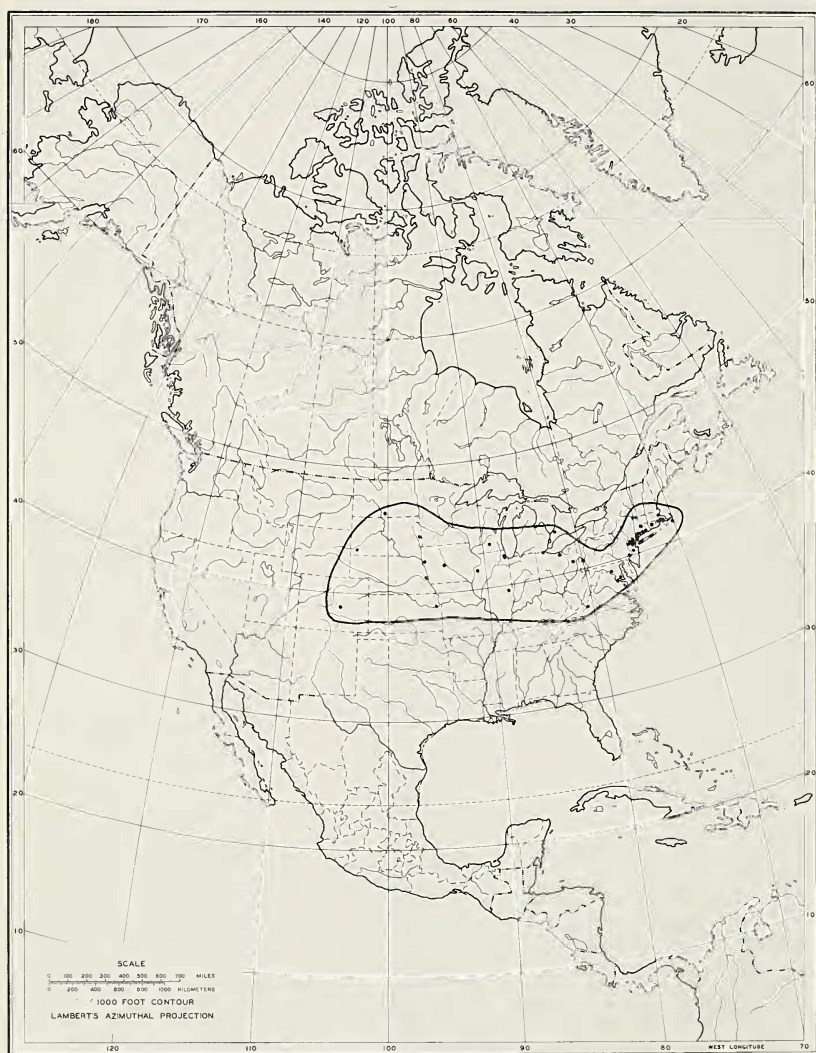


Fig. 3. Map of North America showing the distribution of *Argynnis idalia*.

dividual differences in size and slight differences in the pattern observed on an individual basis. Perhaps statistical differences could, and will, be detected in the future.

The distribution of this species is limited to a central and eastern location across the United States and a small part of Canada. The biological reasons for this restricted distributional range are not known. It can be seen from the map (fig. 3) that the species ranges from New England (specimens which I have seen come from as far as Massachusetts though records indicate Portland, Maine as the furthest point reached north and east), southward to North Carolina (probably erroneous records indicate Georgia), and west to Colorado and North Dakota (probably erroneous records indicate Montana). There are records or indications in old literature for Arkansas but I have seen no specimens from there. The species seem to prefer the area south of the Canadian life zone, that is, the Transition life zone of sorts, though it is pretty hard to outline any definite climatic zonation. Records indicate that it is to be found in most of the southern counties of Michigan and the southern counties of Minnesota. Scudder (1889) writes: "This butterfly belongs to the Alleghanian fauna, though its distribution appears to be somewhat irregular. It inhabits lowlands and is much more abundant in the extreme eastern portion of its range than elsewhere, unless it be the western prairies." Mention of it in Louisiana by Strecker is most probably in error.

A further discussion of the range of this species will be deferred until the maps of other species have been published, which will be used for comparison.

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